BULLETIN

OF THE INSTITUTE OF METALS

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INSTITUTE NEWS

General Meeting, London, 30 June 1954
Lecture on Brittle Fracture

A General Meeting of the Institute will be held at 4 Grosvenor Gardens, London, S.W.1, on Wednesday, 30 June 1954, at 5.0 p.m., when a lecture entitled " The Brittle Fracture of Metals: Some New Developments " will be given by Professor E. OROWAN, F.R.S. (Department of Mechanical Engineering, Massachusetts Institute of Technology). The meeting is open to visitors, and it is hoped that there will be a good attendance of members and others interested in the subject. Tickets are not required.

The lecture is being given under the auspices of the Metal Physics Committee, and is the second of a series by distinguished scientists from overseas that the Committee hopes to arrange from time to time. The first was given on 27 May by Dr.W. Boas of Melbourne.

Election of Members

The following 13 Ordinary Members and 2 Student Members were elected on 26 April:

As Ordinary Members

BLOCH, Ernst Arnold, Dr.-phil., Dipl.-Ing.-Chem., Sous-Directeur, Société Anonyme pour l'Industrie d'Aluminium, Case-Gare 479, Lausanne, Switzerland.

BOWEN, William Trevor, Heat-Treatment and Welding Superintendent, James Archdale and Co., Ltd., Worcester.

BRULL, John Peter, Ph.D., Chief Metallurgist, North American Smelting Company, Marine Terminal, Wilmington 99, Dela., U.S.A.

EVANS, Denzil John, M.Sc., A.Inst.P., I.C.I. Research Fellow, University College of Swansea.

GRANT, Nicholas John, Associate Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A.

GURLAND, Joseph, Sc.D., Manager of Basic Research, Firth-Stirling, Inc., 3113 Forbes Street, Pittsburgh 30, Pa., U.S.A.

HØEG, Johs. Arbo, General Manager, Det Norske Nitridaktieselskap, Drammensveien 88c, Oslo, Norway.

HOPKIN, Graham Llewellyn, O.B.E., B.Sc., F.I.M., Superintendent, Metallurgical Research, Atomic Weapons Research Establishment, Department of Atomic Energy, Aldermaston, Berks.

JAFFEE, Robert I., S.M., Ph.D., Chief, Non-Ferrous Metallurgy Division, Battelle Memorial Institute, 505 King Avenue, Columbus, O., U.S.A.

LESSELLS, John Moyes, B.Sc., Hon. Mem. A.S.M.E., M.I.Mech.E., President, Lessells and Associates, Inc., Consulting Engineers, 916 Commonwealth Avenue, Boston 15, Mass., U.S.A.

MURRAY, Leslie Vincent, Metallurgist, Metals and Alloys, Ltd., Forge Lane, Minworth, Birmingham.

THOMAS, John M., M.S.E., Manager, Metallurgical Research and Development Department, Hoskins Manufacturing Company, 4445 Lawton Avenue, Detroit 8, Mich., U.S.A.

WILSDORF, Heinz Gerhard Friedrich, Dipl.-Phys., Dr.rer.nat., D.Sc., National Physical Laboratory, South African Council for Scientific and Industrial Research, P.O. Box 395, Pretoria, South Africa.

As Student Members

AHERN, Sean Alan, B.Sc., Research Student and Part-time Demonstrator, Department of Physics, University of Sheffield.

EYRE, Terence Stanley, Senior Laboratory Assistant, Coopers Mechanical Joints, Liverpool Road, Slough, Bucks.

PERSONAL NOTES

MR. A. J. CADDICK has resigned his position as General Manager of Sadler and Co., Ltd., Middlesbrough, and is resuming consulting practice.

MR. A. CARTER has left Powderloys, Ltd., Coventry, and is now with Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

DR. W. F. CHUBB has joined the staff of A. and G. Price, Ltd., Engineers and Steelmakers, Thames, New Zealand.

DR. HORACE CLARKE has received the Insignia Award in Technology of the City and Guilds of London Institute.

DR. R. A. DODD has left the staff of the South African Government Metallurgical Laboratory on his appointment as Senior Lecturer in Metallurgy at the University of the Witwatersrand, Johannesburg.

MR. H. EVANS has succeeded Mr. H. W. G. Hignett as Superintendent of the Development and Research Laboratories of The Mond Nickel Co., Ltd., Birmingham.

MR. J. P. EVANS is now at the Atomic Energy Research Establishment, Harwell, Berks.

Mr. F. Flubacher has left England to take up an appointment with Messrs. George Fischer, Ltd., Schaffhausen, Switzerland.

Mr. W. S. Gifford has resigned his position as Joint Managing Director of Electric Furnace Co., Ltd., Weybridge, Surrey, on medical advice. He remains on the Board of the Company and also on the Boards of its subsidiaries Electric Resistance Furnace Co., Ltd., and Electro-Chemical Engineering Co., Ltd. Mr. Gifford has been associated since 1909 with Mr. D. F. Campbell in the manufacture of furnaces.

Mr. A. B. Graham is relinquishing on 1 July his position as General Manager of the Zenith Works of Henry Wiggin and Co., Ltd., Thornliebank. Mr. Graham, who has been with the firm for 28 years, is to take up special duties in connection with production.

Dr. Max Hansen has resigned his position as Manager of the Metals Research Department of the Armour Research Foundation of the Illinois Institute of Technology, Chicago, and will return to Germany before the end of the year.

Dr. J. B. Haworth has left Sheepbridge Engineering, Ltd., Chesterfield, to take up a post with the British Columbia Research Council, Vancouver, B.C.

Mr. J. W. Haywood has been awarded the British Memorial Fund Fellowship in Metallurgy for 1954. He will be working under the direction of Professor H. K. Worner at the University of Melbourne.

Mr. H. W. G. Hignett has been appointed a Director of Henry Wiggin and Co., Ltd., and has taken over the technical (metallurgical) control and development in all the Company's works.

Mr. J. O. Hitchcock has been appointed Assistant to the Chairman of The Mond Nickel Co., Ltd. He will continue to serve on the Board of Henry Wiggin and Co., Ltd., of which he has been hitherto Assistant Managing Director.

Mr. H. D. Hodge has left the Titan Metal Manufacturing Co., Bellefonte, Pa., and is now engaged as a Senior Metallurgist by The Wright Aeronautical Division, Curtiss-Wright Corp., Wood Ridge, N.J.

Mr. L. M. Hogan has been appointed Lecturer in Physical Metallurgy in the University of Queensland, Brisbane, Australia.

Mr. D. W. Hopkins, who is now at the Swansea Vale Works of the National Smelting Co., Ltd., has been appointed Head of the new Department of Metallurgy at the Swansea Technical College, as from 1 September.

Mr. E. F. Mactaggart has sold his interest in Sondes Place Research Institute, Dorking, Surrey, of which he has been a Director for the last seven years, and has resigned from the Board of the consulting firm of Mactaggart and Evans, Ltd., which he founded in 1936 with the late Mr. W. Edmund Evans.

Mr. J. M. Mowat has been elected to the Board of William Beardmore and Co., Ltd., Glasgow. He will continue to act as Chief of Research.

Mr. S. R. C. Poti has been appointed Works Manager of the National Insulated Cable Co., of India, Ltd., Shramnagar. He was previously Assistant Works Manager.

Mr. E. E. Schumacher has been appointed Director of a new department of Metallurgical Research established by the Bell Telephone Laboratories, Murray Hill, N.J. He was previously Chief Metallurgist.

Mr. Arthur D. Schwope has been appointed Director of Metallurgical Research to Brush Laboratories Co., Division of Clevite Corp., Cleveland, O. He was previously with Battelle Memorial Institute.

Mr. R. A. Stauffer has been elected to the Board of Directors of the National Research Corporation, Cambridge, Mass. He has been Vice-President and Director of Research to the Corporation since 1949.

Mr. H. C. Wesson has been appointed to the staff of the Lead Development Association.

Mr. G. T. Whitehouse, Managing Director of Metal Products (Willenhall), Ltd., has been elected President of the Bronze and Brass Ingot Manufacturers' Association for 1954–55.

NEWS OF LOCAL SECTIONS AND ASSOCIATED SOCIETIES

South Wales Local Section

At a meeting of the Section held at University College, Swansea, on 2 March 1954, Mr. T. Burchell (Murex, Ltd.) gave a lecture on:

Aluminothermic Methods

The lecturer said that early in the 19th century it became evident to chemists that, to the traditional methods of carbothermic reduction used in smelting the metals then in use, there would be added other methods utilizing as reducing agents some of the newly isolated metals themselves. The development of these "metallothermic" reductions had been governed to a great extent by the availability of the required sodium, magnesium, or aluminium, as the case might be. Thus, although reduction of other metals from their oxides by finely divided aluminium had been known in 1860, it was not until 1890 that cheap and plentiful supplies of aluminium first made practicable an industrial application.

Advantages favouring this development included: (i) the conduct of hitherto refractory reductions so as to obtain carbon-free metals, where previously the carbon used had formed compounds with limited use; (ii) the exothermic character of the reaction, which allowed simple equipment instead of extensive fixed plant requiring heavy capital expenditure and high fuel cost, and secured good separation of fluid metal and slag; and (iii) the versatility and flexibility of the process arising from this, leading not only to the development of a considerable smelting industry, but also to its use in welding and a number of other applications for the heat evolved.

At present, in Great Britain alone, something like 15,000 tons of metal and alloys were annually being produced by this process and its variants, comprising the greater part of the requirement of "carbon-free" manganese, chromium, titanium, niobium, tantalum, tungsten, molybdenum, vanadium, zirconium, boron, and their alloys with iron, copper, aluminium, nickel, cobalt or with each other.

In the welding of rail and cable joints and the repair of heavy steel castings there was still an increasing use of "Thermit", in

spite of the decline in the familiar tramway work which used to be visible in so many streets.

The thermodynamics of the process was outlined and various special problems discussed, ranging from free energies of formation of the various oxides relative to that of alumina, the time factor and differential rates of reaction, and the melting points of alumina slags with given proportions of other oxides present. Practical factors included the methods used for the subdivision of the aluminium required, and the risks attendant upon the use of an exothermic reaction which demanded rigorous control, as well as the means of initiating the reaction. Useful and elegant as it already was, the process would be greatly developed as new opportunities for its co-ordination with other procedures arose and were grasped.

OTHER NEWS

Lead Development Association

Under the sponsorship of the leading Commonwealth producers of lead, the Lead Development Association has been formed as a non-profit-earning body. The objects of the Association are to extend the knowledge of lead in its manifold uses and to foster appreciation of its services to mankind.

Hitherto, the only organization of its kind in the country giving information on lead matters has been the Lead Industries Development Council, which confined its activities to those connected with lead sheet and lead pipe. With the formation of the Lead Development Association, the name Lead Industries Development Council will no longer be used, and the Council's activities will continue as the Lead Sheet and Pipe Council, which becomes an associate member of the Lead Development Association.

The offices of the Lead Development Association and those of the Lead Sheet and Pipe Council are at Eagle House, Jermyn Street, London, S.W.1. Telephone WHItehall 4175.

Third International Conference on Hot-Dip Galvanizing

The Third International Conference on Hot-Dip Galvanizing will be held from 4 to 9 July 1954. The reception and technical sessions will be in Oxford on 4–7 July; on 7 July the Conference will move to London for a banquet and subsequent works visits. This Conference will be a successor to the First International Conference on Galvanizing held at Copenhagen in 1950, and the Second International Conference held at Düsseldorf in 1952.

The opening reception will be held in the afternoon of Sunday, 4 July. Between 5 and 7 July there will be technical sessions devoted to recent developments in galvanizing, the finishing, testing, and after-treatment of galvanized articles, dross formation and fluxes, and productivity and incentives;

THE STRUCTURE OF METALS AND ALLOYS

REVISED EDITION

by W. HUME-ROTHERY and G. V. RAYNOR

Institute of Metals Monograph and Report Series No. 1. *Cloth, 370 pp. and 8 plates.*

Price 35s. or $5.50, post free. (*Members, one copy at 17s. 6d. or $3.00, post free.*)

This well-known book by Dr. W. Hume-Rothery was first published in 1936, when it achieved an immediate success, and has since been reprinted seven times. Most of the principles outlined in 1936 have stood the test of time, but the tremendous output of research on the structure of metals and alloys has led to a demand for a thorough revision, and a new edition has now been written in collaboration with Professor G. V. Raynor.

The whole text has been revised and brought up to date, with considerable expansion of the parts dealing with solid solutions and intermediate phases in alloys. Completely new sections have been written on ternary alloys and on alloys of iron, whilst the part dealing with imperfections in crystals has been greatly extended and now includes a comprehensive account of the ideas of dislocation theory.

The description throughout has been kept at an elementary level, and can be understood without a knowledge of higher mathematics or of crystallographic notations. In this form the book should be invaluable to all those who, in the widest sense of the term, call themselves students of metallurgy, and it should also be of great value to physicists, chemists, and engineers.

Obtainable through booksellers or from :

THE INSTITUTE OF METALS, 4 GROSVENOR GARDENS, LONDON, S.W.1

there will also be sessions specially devoted to topics of interest to general, wire, sheet, and tube galvanizers.

A " Problems Clinic " will be held in the evening of 6 July. The Conference banquet will take place in London on the evening of 7 July, and visits to galvanizing works in the London and Birmingham areas will be arranged for 8 and 9 July. Further particulars may be obtained from the Zinc Development Association, Lincoln House, Turl Street, Oxford.

Institute of Physics: Non-Destructive Testing Group

The former Industrial Radiology Group of the Institute of Physics has now been reconstituted, with wider terms of reference, as the Non-Destructive Testing Group, which is holding a Summer Meeting at Birmingham University on 7–10 July 1954.

Sessions will be devoted to: (1) isotope techniques, (2) image intensifiers, (3) diffraction mottling, (4) theory and application of electrical and magnetic methods of non-destructive testing, (5) propagation of elastic waves in solids, and (6) selected topics in ultrasonic testing.

Details may be obtained from the Institute of Physics, 47 Belgrave Square, London, S.W.1.

Metallurgical Applications of X-Ray Diffraction

Metallurgical Applications of X-Ray Diffraction will be the subject of a two-week Special Summer Programme from 2 to 13 August during the 1954 Summer Session at the Massachusetts Institute of Technology.

The programme will provide discussions of the principles of X-ray diffraction, illustrated by examples of the practical techniques employed in metallurgical problems. It will be under the direction of Dr. John T. Norton, Professor of the Physics of Metals in the M.I.T. Department of Metallurgy, who will be assisted by other members of the M.I.T. Faculty and staff and by a number of guest lecturers, including: Dr. A. L. Geisler, General Electric Research Laboratories, Schenectady, New York, Dr. Herbert Friedman, Naval Research Laboratory, Washington, D.C., and Professor B. D. Cullity, Metallurgy Department, Notre Dame University, South Bend, Indiana.

The programme is planned to include lectures in the mornings and laboratory demonstrations and discussions in the afternoons. Topics to be considered will include: emission and absorption of X-rays; the diffraction process; interpretation of powder diffraction patterns; precise lattice-constant determination; application to the study of phase diagrams; film cameras and diffractometers; crystal orientation; texture and preferred orientation; measurement of residual stress; and X-ray fluorescent analysis.

The lectures will be intended for metallurgists who have not had advanced work or who may have left college several years ago. Elementary knowledge of the nature of X-rays and the structure of metals will, however, be required. Tuition will be $180; academic credit will not be offered.

Further information and application forms may be obtained from the Summer Session Office, Room 7–103, M.I.T., Cambridge 39, Mass., U.S.A.

APPOINTMENTS VACANT

A SENIOR METALLURGIST with some 8 years' post-graduate experience in light alloys, either in the aircraft industry or in the fabrication of components, and preferably with a knowledge of casting and forging, is required by the English Electric Co., Ltd., Luton, for an interesting position in a rapidly expanding industry. Applications to Dept. C.P.S., 336/7 Strand, London, W.C.2, quoting ref. 1112C.

DEFENCE RESEARCH BOARD OF CANADA. Naval Research Establishment, Halifax, Nova Scotia, has a vacancy for a Metallurgist with a recognized degree in metallurgy, with preferably, but not necessarily, one or two years' industrial experience. Duties to include examination of service metallurgical failures (ferrous and non-ferrous) in R.C.N. ships and undertake metallurgical research in the field of the improvement of metallurgical components in warships. Interview in London, England, during June 1954. Starting salary at the B.Sc. level is $3750 and at the Ph.D. level is $4950, with appropriate increments corresponding to post-graduate experience. It is possible to arrange temporary housing accommodation for six months after arrival in Canada. Application forms may be obtained by writing to Defence Research Member, Canadian Joint Staff, 66 Ennismore Gardens, London, S.W.7, to whom they should be returned not later than 15 June 1954.

RESEARCH LABORATORIES of The General Electric Co., Ltd., North Wembley, Middx., have the following vacancies for graduates: Metallurgists, Physicists, and Physical Chemists for research and development work in the Metallurgy Group in the following fields: (1) Powder metallurgy; (2) Brazing; (3) Controlled atmospheres; (4) General investigations (non-ferrous metals). Candidates should be not older than 30 years of age, and if under 26 must have completed National Service. Apply in writing to Staff Manager (Ref. RLO/313), giving full particulars of age, qualifications, and experience.

UNIVERSITY OF NOTTINGHAM

Postgraduate Studentships and Scholarships

A number of awards of values varying up to £300 per annum will be made to candidates wishing to carry out research in any appropriate field of learning in Arts, Law, Social Science, Education, Pure Science, Agriculture, Horticulture, Agricultural Science, or Applied Science (including Metallurgy). Further information and forms of application may be obtained from the Registrar, to whom the completed forms must be returned not later than 1 July 1954.

UNIVERSITY OF OTAGO

Dunedin, New Zealand

The University proposes to appoint a SENIOR LECTURER IN METALLURGY.

Salary range £1092 8s. × £50 to £1292 8s.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon Square, London, W.C.1.

The closing date for the receipt of applications, in New Zealand and London, is 1 July 1954.